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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/072,438	02/05/2002	Guy Della-Cioppa	00801.0137.CNUS18	3911

25871 7590 04/30/2004

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EXAMINER	
MEHTA, ASHWIN D	
ART UNIT	**PAPER NUMBER**
1638	

DATE MAILED: 04/30/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/072,438	DELLA-CIOPPA ET AL.	
	Examiner	Art Unit	
	Ashwin Mehta	1638	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *05 February 2002*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-20* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-20* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *05 February 2002* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *7052002*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Specification

1. The specification fails to comply with the sequence rules of 1.821-1.825. For example, nucleotide and amino acid sequences appear in Figures 1, 3, 4, 10, 12, 13, 20, and 22-27 that are not referred to by their sequence identifiers. The brief descriptions of theses figures, on pages 11-12, should be amended to recite the relevant sequence identifiers.

Nucleotide sequences also appear on page 88, lines 22 and 25; page 89, lines 14, 15, 24; page 90, line 10; page 92, line 5; page 98, lines 19-32; page 99, lines 3-6, 9; page 108, lines 19-21; and page 109, lines 13-25, that must be referred to by their sequence identifiers.

2. Page 40, line 26, and page 43, line 17, recite U.S. patent application serial numbers. These recitations should be amended to recite the status of the application (abandoned or, if allowed, the patent number).

Claim Objections

3. Claim 7 is objected to because of the following informality: in line 2, "5" should be --5°--. Appropriate correction is required.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

4. Claims 1-20 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

In claims 1, 2, and 20: the claims indicate that they are drawn to methods for identifying a gene function in a plant. The methods comprise complementing a conditional lethal mutation in a plant by transfecting the plants with a viral vector that contains an unmutated copy of the mutated gene. However, for this step to occur, the unmutated copy of the mutated gene, and therefore its function, would already be known. It is therefore unclear whether the claims are missing one or more necessary steps. As currently written, the function of the mutated gene would already have to be known.

Further in claims 1, 2, and 20: the recitation, "conditional lethal mutation" renders the claims indefinite. It is not exactly clear what mutations are considered to be conditional lethal mutations. The term "lethal" indicates that the mutation kills the plant containing it, and the term, "conditional" indicates that the mutation is lethal only under certain conditions. However, the specification on page 47 indicates that the method for identifying a gene function comprises growing a plant under permissive conditions, exposing that plant to restrictive conditions for at least about one growth cycle, and then shifting the plant to second permissive conditions and selecting a plant having a lethal mutation (lines 8-15). From this teaching, the conditional lethal mutation apparently does not kill the plant, since it survives the restrictive conditions. Therefore, it is not clear what a "conditional lethal mutation" is intended to be, and it is not clear what kind of effect it has on a plant possessing it.

Further in claims 1, 2, and 20: the recitations, "permissive conditions" and "restrictive conditions" render the claims indefinite. The specification at page 47, lines 22-28 recites examples of permissive and restrictive conditions. However, the term "includes in the recitations, "The first permissive conditions include" (page 47, lines 23-24), and "The restrictive conditions include" (page 47, line 26) is considered "open" language. It is not clear what other conditions are considered to be permissive and restrictive.

In claim 2: the claim is indefinite because the preamble is inconsistent with the last recited step of the method. Line 1 states that the method is for identifying a gene function in a plant. However, the last step of the claimed method, step (e), indicates that a set of selected plants are grown and a mutated gene is complemented. Nothing is mentioned in step (e) about identifying a gene function.

In claim 3: the recitation, "a gene" in line 2 renders the claim indefinite. It is not clear if the recitation is referring to the unmutated copy of the mutated gene mentioned in claims 1 and 2, or another gene. It is suggested that the article "a" in line 2 of claim 3 be replaced with --said--.

In claim 5: the recitation, "the plant tissue, plant cell, or plant organ" in line 2 renders the claim indefinite. There is insufficient antecedent basis for this recitation.

In claim 7: there is improper antecedent basis for the recitation, "wild type infected plant." There is no previous mention of an infected plant in the claim, or in claims 1 or 2.

In claim 8: the recitation, "at least about" in line 2 renders the claim indefinite. It is not clear that temperatures can be considered to be "at least about" 15°C. For example, are 13°C and 20°C at least about 15°C?

In claim 9: the recitation, "substantially" in line 2 renders the claim indefinite. It is not clear what differences are permitted between the first and second permissive conditions such that the second permissive conditions can be considered to be "substantially" the same as the first permissive conditions, as opposed to different permissive conditions.

In claim 10: line 1 recites "the plant cells in growing step (a) are replica plated plant cells on plant leaf disks". There is insufficient antecedent basis for this limitation in the claim or in claims 1 and 2. Step (a) of claims 1 and 2 do not mention any cells.

In claim 11: line 1 recites, "the period of time in step (c)". There is insufficient antecedent basis for this recitation in the claim or claims 1 and 2. Step (c) of claims 1 and 2 do not mention any period of time.

Further in claim 11: the recitation, "equivalent" in line 1 also renders the claim indefinite. It is not clear what period of time can be considered to be "equivalent" to at least one growth cycle. It is suggested that the recitation be deleted.

In claim 14: the claim is indefinite because it is not clear if the mutagen is in addition to the mutagen mentioned in claim 13.

In claim 16: the recitation, "wherein said plant is a transgenic plant" renders the claim indefinite. It is not clear what the transgene encodes. For example, is the transgene causing the mutation, or is it just encoding a product that has nothing to do with the mutation?

5. Claims 1-20 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant

art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

The claims are broadly drawn towards a method for identifying a gene function in a plant comprising a conditional lethal mutation in a gene, comprising the steps of (a) growing one or more plants under first permissive conditions, (b) growing a first set of plants from (a) under restrictive conditions to determine the presence of a conditional lethal mutation, (c) selecting one or more plants from (b) that are sensitive to said restrictive conditions, (d) growing a second set of plants from (a) that are genetically identical to those selected in (c), under second permissive conditions, and (e) growing a third set of plants produced in (a) and genetically identical to those selected in (c) under restrictive conditions and complementing a mutated gene of said plants by transfecting them with a viral vector containing an unmutated copy of the mutated gene, thereby identifying a gene function; or said method further comprising isolating the gene from the viral vector, identifying its function and encoded product, and sequencing said gene; or a method for identifying a gene function in a plant carrying a conditional lethal mutation comprising (a) selfing a plant that is heterozygous for a conditional lethal mutation to make a homozygous mutant, and (b) growing said homozygous mutant plant under a restrictive condition and complementing a mutated gene of said plant by transfecting it with a viral vector containing an unmutated copy of the mutated gene.

The specification prophetically indicates that genomic DNA or cDNA library construction in a recombinant viral nucleic acid vector, and transfection of individual clones from the library into T-DNA tagged or transposon tagged or mutant plant can be performed (73, Example 17). The specification indicates that Arabidopsis genomic DNA represented in BAC or

YAC libraries may be obtained from the Arabidopsis Biological Resource Center (page 72, lines 3-5).

A review of claim 1 indicates that it is drawn to a method whose steps encompass growing plants of any species under conditions that permit growth, growing the plants under one or more restrictive conditions to determine the presence of a conditional lethal mutation, growing plants that are genetically identical to a plant comprising a conditional lethal mutation under restrictive conditions and transfecting them with a viral vector comprising an unmutated copy of the mutated gene. Claim 2 indicates that the plants containing a conditional lethal mutation are grown under first permissive conditions, then exposed to one or more restrictive conditions, then grown under a variety of permissive conditions, and under restrictive conditions again, then the mutant gene is complemented by transfecting the plants with a viral vector containing an unmutated copy of the mutated gene. The method of claim 20 requires selfing plant that is heterozygous for a conditional lethal mutation to obtain a plant homozygous for said mutation, growing the plant under restrictive conditions and transfecting it with a viral vector comprising an unmutated copy of the mutated gene. Unmutated copies of any gene of any plant are required for the methods of claims 1, 2, and 20.

The specification, however, does not describe unmutated copies of all plant genes. The structures of all unmutated plant genes are not described by the specification. As different genes have different functions, the structures of unmutated genes known in the prior art cannot be correlated with the structures of all other unmutated genes, wherein mutations in the genes causes a conditional lethal phenotype. The Federal Circuit provided the appropriate standard for written description in University of California v. Eli Lilly & Co. 119 F.3d 1559, 43 USPQ2d

1398 (Fed. Cir. 1997). The court held that a structural description of a rat cDNA was not an adequate description of broader classes of cDNAs, because a "written description of an invention involving a chemical genus, like a description of a chemical species, requires a precise definition, such as by structure, formula, [or] chemical name, of the claimed subjected matter sufficient to distinguish it from other materials. Also see Fiers vs. Sugarno, 25 USPQ 2d (CAFC 1993) at 1606, which states that "[a]n adequate written description of a DNA requires more than a mere statement that it is part of the invention and reference to a potential method for isolating it; what is required is a description of the DNA itself". Given the breadth of the claims, it is submitted that the specification fails to provide an adequate written description of the multitude of unmutated genes encompassed by the claims.

6. Claims 1-20 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention.

The claims are broadly drawn towards a method for identifying a gene function in a plant comprising a conditional lethal mutation in a gene, comprising the steps of (a) growing one or more plants under first permissive conditions, (b) growing a first set of plants from (a) under restrictive conditions to determine the presence of a conditional lethal mutation, (c) selecting one or more plants from (b) that are sensitive to said restrictive conditions, (d) growing a second set of plants from (a) that are genetically identical to those selected in (c), under second permissive conditions, and (e) growing a third set of plants produced in (a) and genetically identical to those

selected in (c) under restrictive conditions and complementing a mutated gene of said plants by transfecting them with a viral vector containing an unmutated copy of the mutated gene, thereby identifying a gene function; or said method further comprising isolating the gene from the viral vector, identifying its function and encoded product, and sequencing said gene; or a method for identifying a gene function in a plant carrying a conditional lethal mutation comprising (a) selfing a plant that is heterozygous for a conditional lethal mutation to make a homozygous mutant, and (b) growing said homozygous mutant plant under a restrictive condition and complementing a mutated gene of said plant by transfecting it with a viral vector containing an unmutated copy of the mutated gene.

The specification prophetically indicates that genomic DNA or cDNA library construction in a recombinant viral nucleic acid vector, and transfection of individual clones from the library into T-DNA tagged or transposon tagged or mutant plant can be performed (73, Example 17). The specification indicates that Arabidopsis genomic DNA represented in BAC or YAC libraries may be obtained from the Arabidopsis Biological Resource Center (page 72, lines 3-5).

The methods of claims 1, 2, and 20 broadly require unmutated copies of all mutated plant genes that are conditional lethal mutants. However, the specification does not reduce to practice all such unmutated genes. The prior art does not teach the isolation of unmutated copies of all such plant genes. In the absence of further guidance, undue experimentation would be required by one skilled in the art to isolate unmutated copies of all mutated genes that are conditional lethal mutations in any and all plants. See In re Bell, 26 USPQ2d 1529, 1532 (Fed. Cir. 1993)

and In re Deuel, 34 UPSQ2d, 1210 (Fed. Cir. 1995), which teach that the mere existence of a protein does not enable claims drawn to a nucleic acid encoding that protein.

The specification also prophetically indicates that the method for identifying a gene function in a plant comprising a conditional lethal mutation comprises growing plants in a first permissive condition, exposing those plants to restrictive conditions for a period of time of at least about one growth cycle, and shifting the plants to a second permissive condition, and selecting a plant having a lethal mutation (page 47, lines 8-15). According to the specification, the plants comprising a conditional lethal mutation must survive restrictive growth conditions, under which the mutation should kill the plant. However, it is not clear, and not taught by the specification, how a plant that has a lethal mutation can survive such conditions. The specification does not teach any such plant that has conditional lethal mutation that survives the restrictive conditions that kills the plant. The specification also does not teach how to identify a plant having a conditional lethal mutation if the plant survives the restrictive conditions. In the absence of further guidance, undue experimentation would be required by one skilled in the art to identify plants having a conditional lethal mutation when the plants survives the restrictive conditions that should kill it.

Further, the method of claim 2 requires growing plants that have a conditional lethal mutation, under one or more restrictive conditions, selecting those plants that are sensitive, and then growing them under a variety of permissive conditions. However, these plants would die under the restrictive conditions, as they have a conditional lethal mutation. It is not clear how one skilled in the art would grow the plant under a permissive condition, since the restrictive condition would kill it. See Genentech, Inc. v. Novo Nordisk, A/S, 42 USPQ2d 1001, 1005

(Fed. Cir. 1997), which teaches that "the specification, not the knowledge of one skilled in the art" must supply the enabling aspects of the invention.

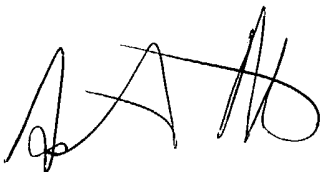
Further, regarding claim 14: the claim encompasses plants that have been mutagenized with a mutagen selected from a Markush group that includes heat and sound. However, the specification does not teach plants mutagenized using heat or sound, nor any methods for mutagenizing any plant material using heat or sound as mutagens. The prior art also lacks teachings and examples of such methods for producing mutations in plants. In the absence of further guidance, undue experimentation would be required for one skilled in the art to produce the novel methods of mutagenizing plants using heat or sound. See Genentech, Inc. v. Novo Nordisk, A/S, *supra*. Given the breadth of the claims, unpredictability of the art and lack of guidance of the specification as discussed above, undue experimentation would be required by one skilled in the art to make and use the claimed invention.

7. Claims 1-20 are rejected.

Contact Information

Any inquiry concerning this communication or earlier communications from the Examiner should be directed to Ashwin Mehta, whose telephone number is 571-272-0803. The Examiner can normally be reached from 8:00 A.M to 5:30 P.M. If attempts to reach the Examiner by telephone are unsuccessful, the Examiner's supervisor, Amy Nelson, can be reached at 571-272-0804. The fax phone numbers for the organization where this application or proceeding is assigned are 703-872-9306 for regular communications and 703-872-9307 for

After Final communications. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



4/27/2004

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Art Unit 1638